Designing adverse event prevention programs using quality management methods: the case of falls in hospital

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Abstract

Objective. From a public health perspective, the effectiveness of any prevention program depends on integrated medical and managerial strategies. In this way, quality management methods drawn from organization and business management can help design prevention programs. The aim of this study was to analyze the potential value of these methods in the specific context of preventing falls in hospital.

Setting. Medical and Rehabilitation Care Unit of Saint-Maurice National Hospital (France).

Design. In phase 1, two surveys assessed the context in which falls occurred. The first survey (1995) quantified adverse events during a 1-year period (n = 564) and the second (1996–1997) documented the reasons for falls (n = 53). In phase 2, a set of recommendations to prevent falls was elaborated and implemented throughout the hospital.

Results. The fall frequency in this unit was 18.3% in 1995. Analysis showed organizational causes in 35 (66%) of the 53 documented falls; 24 of them were associated with individual factors. Even though the two categories of causes are interdependent, their distinction enables specific recommendations. The proposed organizational management changes recommended do not aim to achieve an illusory objective of ‘zero falls’, but are designed to reduce the number of avoidable falls and to limit the negative consequences of unavoidable falls.

Conclusion. Quality improvement methods shed new light on how to prevent falls. An unexploited potential for prevention lies in organization and management of care for hospitalized patients.

Keywords: continuous quality improvement, falls, organization, prevention program, public health, the elderly

Many prevention programs are, naturally, approached from clinical and statistical perspectives. Clinical and organizational strategies, care effectiveness, and risk/benefit of preventive measures are often not well defined, but the efficacy of these programs also depends in many ways on management and organizational processes. Firstly, different causes of the occurrence of an adverse event can be due to organizational dysfunction (e.g. lack of coordination among caregivers). Secondly, implementation of preventive measures requires management skills regarding availability, affordability, and acceptability of procedures to prevent these adverse events, for which clinicians are rarely trained. Preventive measures must eventually be taken by others who help to manage the adverse event when it unfortunately occurs. For this reason, all levels of prevention and risk management must be considered, from primary prevention (targeting risk factors to prevent occurrence of disease or injury), to secondary prevention (targeting subclinical disease through early identification and treatment), to tertiary prevention (aiming at established disease or injury to ameliorate progression and maximize function for the person affected). In this context, continuous quality improvement (CQI)/total quality management can enhance clinical outcomes through management channels, enriching prevention program effects. We define CQI as ‘an ongoing process whereby top management takes whatever steps necessary to enable everyone in the organization, in the course of
performing all duties, to establish and achieve standards which meet or exceed the needs and expectations of their customer [1]. The aim of this paper is to test the value of a quality improvement approach in the specific case of falls prevention.

Falls are common among elderly hospital in-patients of any countries [2–4]. Their consequences are serious, with 1.3–14% of patients sustaining fractures [5–7]. Psychological effects such as fear of falling, anxiety, and depression, and also loss of confidence compound patient problems [8]. Falls by in-patients are also associated with a greater chance of unplanned re-admissions and of discharge to nursing homes [9]. Therefore, the occurrence of falls often represents a turning point in the clinical course of elderly persons, in addition to increased costs to the system.

The prevention of falls remains a challenging issue [10]. Many clinical characteristics, including use of particular medications, muscle weakness, postural hypotension, and poor vision increase the incidence of falls occurring at home or outdoors [11], and contribute towards the possibility of a fatality. Moreover, in the specific context of hospital, falls are often perceived by physicians and nurses as an unavoidable consequence of encouraging patients to regain mobility shortly after an acute illness.

In October 1996, a study entitled ‘Programme d’Amélioration de la Qualité’ (Quality Improvement Program) was commenced to prevent falls in the National Rehabilitation Hospital of Saint-Maurice (France). This project was sponsored by the French Ministry of Health and the National Agency for Accreditation as a national research and demonstration program. The Medical and Rehabilitation Unit was chosen for this program because of its relatively high frequency of falls, due to its patient characteristics, over many years.

A CQI program was implemented in two distinct phases: phase 1, an accurate enumeration and assessment of falls, viewed as undesirable events appearing during the process of care; and phase 2, development and diffusion of a set of recommendations for preventing the falls. The goal of the study was to evaluate the effects of CQI on prevention strategies. Using this study design, we are able to report on the benefits of using CQI in designing a prevention program.

### Methods

The two phases were conducted at the National Rehabilitation Hospital of Saint-Maurice in the eastern suburbs of Paris, a 400-bed rehabilitation, re-education, and follow-up hospital with both in-patient and outpatient services. During phase 1, the Medical and Rehabilitation Unit was the pilot unit of the study. This unit had 100 beds in five wards. In 1995, the bed occupation rate was 84%, the average length of stay was 36 days (standard deviation 15 days), and its patients were mainly elderly persons with a mean age of 76.0 years (standard deviation 20.3 years). A majority returned home (73%), whereas 8% were discharged to long-term care. There were 575 patients accounting for 860 admissions.

#### Phase 1: assessment of falls

The general principles of CQI require acknowledgement and assessment of the undesirable ‘fall’ event as a process, in which the decomposition of an activity occurs in several steps. A fall was defined, according to Oliver et al. [12], as ‘all situations in which a patient suddenly and involuntarily came to rest upon the ground or surface lower than their original station’.

For assessing falls, we combined two types of study: (1) a retrospective survey to quantify the number of falls; and (2) a prospective study to identify the causes of falls. The first survey was undertaken in 1996. It included all patients admitted to the unit during 1995 ($n = 575$). Data were collected from the falls register, an administrative database in which all professionals have to declare falls, from the hospital medical information system and from the patients’ medical records. From the hospital medical information system, we obtained a list of the 575 in-patients admitted to the unit in 1995. We then recorded the patients who were the subject of a declaration in the administrative register and began to collect the set of data described below. At the end, we reviewed the medical record of the 575 patients in order to complete the data set and to compare the different sources of data. Eleven patients were excluded due to lack of information about their identity or because their medical records were not obtained, leaving a sample of 564 patients (which accounts for 822 admissions).

Using the above approach, the following data were collected:

1. Patient characteristics: age, sex, pathology (principal diagnosis of hospitalization), and dependence;
2. Place and time of the falls;
3. Consequences of the falls (e.g. fractures, cranial trauma, soft tissue injuries, anxiety, depression, fear of falling, loss of confidence).

The falls were the unit of analysis. Patients who fell more than once were included in several data sets. Data obtained during this retrospective study allowed us to quantify the number of falls and to observe the quality of the fall register’s account (by comparison of the number of these accounts and the number of falls noted in the patient’s medical records). However, they did not allow us to analyze the specific circumstances of each fall’s occurrence, and so to understand the causes of the falls. No existing record, even that of the patient, was found to provide a detailed description of the factors leading to the fall.

Therefore, we developed a prospective qualitative study, which ran from August to December 1996. This study was based on interviews with patients who fell and aimed to identify causes of falls. For each fall ($n = 59$) our procedure was the same: (1) within 48 hours of each fall, and after explaining the study and promising anonymity, we requested the patient’s consent to be interviewed; (2) we reviewed the patients’ medical records and then interviewed them, their neighbors, members of the attending staff, and others who were present at the time of the falls in order to understand
fully how they occurred; and (3) we created a typology of the aetiologies of the falls using this material, based on the analysis of 53 cases (we were not able to identify causes for six cases, where patients had been found on the floor). One fall could have more than one aetiology. For each case, two observers analyzed the data in order to consider the number and the types of aetiology, and to determine the main aetiology. They started with a list of individual aetiologies well known in the literature, but also considered the possibility of system failures as mentioned in the CQI literature [13]. The number of cases analyzed \( n = 53 \) was determined by the principle of ‘saturation of categories’, i.e. we had to analyze sufficient new cases until we had found again the same aetiologies for each category [14]. After 42 cases, no new aetiologies were identified; the last 11 cases analyzed proved that all causes were already defined. Comparison of the analyses of the two observers showed seven cases of discordance, which they re-examined together to obtain consensus.

**Phase 2: developing and implementing recommendations**

According to the principles of CQI, actions for improving a phenomenon must be deduced from the first step (assessment of the phenomenon). We created a focus group in order to develop a set of recommendations derived from the results of the assessment of falls and their aetiologies. This focus group was composed of care professionals: two nurses, two physicians, the unit’s head nurse, the financial director, and the medical director. Their work, started in December 1996, was based on the results of phase 1, combined with their own empirical experience of the phenomenon plus a review of the existing literature. The group produced recommendations by informal consensus, covering primary, secondary, and tertiary prevention of falls, as defined above. An initial version was submitted to a panel of two physicians, four nurses (from the unit), and two members of the administrative staff. Comments given in return led to production of a revised version, which was presented to the advisory committee and senior hospital management in June 1997.

The next step was to implement these recommendations in the pilot unit and also in the other three units of the hospital that had experienced falls. These three units have an overall capacity of 120 beds and also specialize in rehabilitation care, but admit younger patients (mean age 54 years, range 23–81 years). Adaptations due to the specific context of each unit required one meeting with the staff of each unit. The hospital’s nursing committee also played a major role by scheduling different meetings, where these recommendations were explained to 21 nurses working in the three units. They decided to maintain the same set of recommendations and to allow for some of them to be developed further to fit the specific context of each unit.

Finally, an impact study of this prevention program was conducted in 1998. Rates for falls (number of falls occurring during the year per number of patients hospitalized during the same year), fallers (number of patients who fell during the year per number of patients hospitalized during the same year), and multi-fallers (number of patients who fell more than once during the year per number of patients hospitalized during the same year) were assessed from the administrative register and the hospital medical information system. These rates were compared for the years 1995 and 1998.

Statistical analysis was performed with SPSS. Association between the occurrence of falls and patients’ characteristics, and comparisons of the time scales of falls, fallers, and multi-fallers were analyzed by \( \chi^2 \) and Fisher’s exact tests. Continuous variables were analyzed by Student’s two-sample \( t \)-tests. For all statistical tests, \( P < 0.05 \) was considered significant.

**Results**

**Phase 1: assessment of falls**

**Definition of the process.** Referring an event or an activity to a process in this specific case required choosing between either the clinical phases (prevention, diagnosis, treatment) or the overall process of care during the patient’s hospitalization. According to CQI, we choose the latter because of its ability to describe the concrete phases of the patient’s care, developing a longitudinal reading of the phenomena (Figure 1).

**Characteristics of fallers.** Of 564 people admitted to the unit in 1995, 103 were victims of falls (18.3%), accounting for 245 falls entered in the medical records. Compared with the 195 falls recorded in the falls register, this number points to a 20.4% under-reporting rate. As shown in Table 1, patients with at least one fall during their hospitalization differed significantly from non-fallers (\( n = 461 \)): they were older, had undergone a longer length of stay, included more men, had more neurological causes of hospitalization, and were more likely to be institutionalized at discharge. The majority of falls occurred at the end of the week (20% on Friday alone). Their daily distribution also showed three peaks of frequency (10 am, 1 pm, and 7 pm). The location of falls was most often the bedroom or contiguous spaces, e.g. the bathroom, or during transfer.

In terms of consequences, the administrative falls report recorded a fracture rate of 5%, while patient medical records found it to be 10%. This difference is explained, in part, by the fact that the falls register did not contain information on subsequent clinical consequences.

**Aetiology of falls.** The aetiologies of falls were identified from the prospective study. For the 53 documented falls, we identified 111 aetiologies, which corresponds to a mean of 2.1 aetiologies (range 1–4) per fall. In 35 cases of falls (66%), specific circumstances appeared to be associated with the occurrence of the fall (e.g. the patient’s foot caught the phone wire, the opening or closing of the elevator door, lack of assistance for toileting during the post-prandial period, lack of coordination between the transfer of patients and floor cleaning). It is difficult to evaluate the exact interaction between individuals and organizational factors with respect to the causes of falls, but the analysis of each case by two
Figure 1  Overall process of care during hospitalization.

Table 1  Comparison of age and length of hospital stay between ‘fallers’ and ‘non-fallers’

<table>
<thead>
<tr>
<th>Patients</th>
<th>Victims of falls (n = 103)</th>
<th>‘Non-fallers’ (n = 461)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean age (years)</td>
<td>79.6</td>
<td>75.8</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Mean length of stay (days)</td>
<td>51.3</td>
<td>33</td>
<td>0.001</td>
</tr>
</tbody>
</table>

observers showed that there were four types of interaction: 22 cases where organizational factors were considered the main reason (11 of these were combined with individual factors), and 31 cases where individual factors were considered as the main reason (13 of these were combined with organizational factors).

From these facts, we built a typology consisting of two categories of causes: one addressed individual factors, and the other organizational features. As we have already mentioned, these two categories of causes were not mutually exclusive in explaining falls, they were interdependent. Table 3 lists these two sets of factors, and gives the number of falls to which each factor was found to contribute and the number for which the factor was considered the main cause. Thus, we structured recommendations based on both the individual and organizational cause categories.

Phase 2: elaborating and implementing recommendations

A set of recommendations was defined at the beginning of 1997. They contained both clinical measures and organizational aspects:

1. Implement procedures upon the patient’s arrival in the care unit.
2. Develop a medical score in order to evaluate the risk of falls.
3. Discuss with patients and their families the risk of falls, emphasizing organizational aspects of daily activities.
4. Implement procedures concerning the transfer of patients, allowing for better coordination among staff members of the different units.
5. Implement new procedures concerning the internal organization of the unit (for example, one procedure should specify the need for regular analysis of falls).
6. Improve the use of information systems with regard to the description of falls (patient file and falls register).

These recommendations were disseminated in the pilot unit during the summer of 1997, and to the three other units during October 1997. Most of them were components of an awareness campaign addressed to patients and their families. For instance, we demonstrated one recommendation concerning the patient’s arrival (recommendation No. 1) in its full form:

1. Allow sufficient time for completion of the reception phase. Admission is a major phase in the patient’s care, which requires time; it is an actual part of the care process.
2. Estimate on admission (within 24 hours) the patient’s self-sufficiency and risk of falling (using the list of characteristics and the mobility score listed in recommendation No. 2).
3. Verify the patients’ needs (e.g. glasses, suitable shoes, toilet-case).

Implementation of these recommendations was carried out during the second half of 1997. Although we had no formal
Table 2  Comparison of qualitative variables between ‘fallers’ and ‘non-fallers’

<table>
<thead>
<tr>
<th>Patients</th>
<th>Victims of falls, n (%)</th>
<th>‘Non-fallers’, n (%)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>44 (42.6)</td>
<td>140 (30.4)</td>
<td>0.01</td>
</tr>
<tr>
<td>Women</td>
<td>59 (57.4)</td>
<td>321 (69.6)</td>
<td></td>
</tr>
<tr>
<td>Neurological pathology¹</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>44 (44)</td>
<td>46 (10)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>No</td>
<td>57 (56)</td>
<td>412 (90)</td>
<td></td>
</tr>
<tr>
<td>Institutionalization after hospitalization</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>14 (17.5)</td>
<td>18 (5)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>No</td>
<td>66 (82.5)</td>
<td>337 (95)</td>
<td></td>
</tr>
</tbody>
</table>

¹Data missing due to the poor quality of medical records.

Table 3  A typology of the causes of falls

<table>
<thead>
<tr>
<th>Cause of falls</th>
<th>No. of cases in which the factor is:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>identified as a cause</td>
</tr>
<tr>
<td>Individual factors</td>
<td>69</td>
</tr>
<tr>
<td>Medical pathology (e.g. agitation, hypotension)</td>
<td>15</td>
</tr>
<tr>
<td>Dependence (e.g. mobility, visual impairment)</td>
<td>23</td>
</tr>
<tr>
<td>Related to treatment (e.g. opiates, sedatives)</td>
<td>31</td>
</tr>
<tr>
<td>Organizational factors</td>
<td>42</td>
</tr>
<tr>
<td>Dependence on use of equipment</td>
<td>7</td>
</tr>
<tr>
<td>Table on wheels</td>
<td>1</td>
</tr>
<tr>
<td>Misuse of physical restraints</td>
<td>3</td>
</tr>
<tr>
<td>Walker</td>
<td>3</td>
</tr>
<tr>
<td>Linked to the structure of the hospital</td>
<td>10</td>
</tr>
<tr>
<td>Telephone cords</td>
<td>3</td>
</tr>
<tr>
<td>Use of elevator and automatic fire doors</td>
<td>3</td>
</tr>
<tr>
<td>Bad position of handrails</td>
<td>4</td>
</tr>
<tr>
<td>Lack of assistance</td>
<td>13</td>
</tr>
<tr>
<td>Walking without cane in balneotherapy</td>
<td>3</td>
</tr>
<tr>
<td>Operation of firebreak doors without</td>
<td>7</td>
</tr>
<tr>
<td>accompanying caregiver</td>
<td></td>
</tr>
<tr>
<td>Wet floor</td>
<td>3</td>
</tr>
<tr>
<td>Poor perception of risk</td>
<td>8</td>
</tr>
<tr>
<td>(no assistance for improving mobility)</td>
<td></td>
</tr>
<tr>
<td>Poor coordination of patient/professional care</td>
<td>4</td>
</tr>
<tr>
<td>(unanswered call, misunderstanding concerning need for assistance)</td>
<td></td>
</tr>
<tr>
<td>All factors</td>
<td>111</td>
</tr>
</tbody>
</table>

strategy, we were aware of removing several barriers to this implementation. This is not to say that this project did not experience problems. As in most hospitals, the information systems were not able to provide the required data without some difficulties. The same people were repeatedly involved in the project efforts, and it was sometimes difficult to get the right people together and to develop ownership of the project. However, the project also reinforced known key
factors for success. Shortell et al. [15,16] defined four types of barrier to success: (1) structural, (2) cultural, (3) technical, and (4) strategic. We had to deal with different situations related to each of these, as described below.

1. **Structural dimension.** Larger hospitals find that size inhibits effective interaction and communication. In our study, the pilot unit was composed of five wards and the three other units were not in the same building. The focus group, composed of people working in these different units, and the nurse manager meetings allowed us to develop more of a cross-functional approach that cut across units.

The existing information system was not useful for producing data that we could use to analyze the causes of falls. For this reason, we developed a specific qualitative and prospective study. However, we never tested the possibility of developing a system that could allow for a routine assessment procedure in all care units. This would stipulate the need for specific analyses of falls, but would also require prolonging the program to a point when there would be no more specific support. Therefore, we are currently developing a risk assessment tool that could be used to promote prevention programs for patients at high risk of falling.

2. **Cultural dimension.** Organizational and psychological barriers exist among hospital units, limiting the extent to which people are willing to participate in cross-unit projects. For this reason, integrating members of each unit has been a key factor in the successful development and implementation of recommendations with respect to daily activity. In addition, documentation of falls was not seen as punishment-oriented: identification of systems failures helps to reinforce a team-oriented approach more than an individual one.

3. **Technical dimension.** The lack of physicians’ and managers’ involvement is an important barrier to the implementation of recommendations. In our study, both clinicians and management were involved in a coordinated approach, which is essential given the importance of the individual patient factors and the environment. The term ‘coordination’ often represents only a word; rifts among physicians, other caregivers and administrative groups, rather than a real coordinated approach, is often revealed. In our experience, several factors were essential for providing a concrete sense of ‘a coordinated approach’: the quality improvement rule, which defines the event, the multidisciplinary character of the program expressed in the composition of each group, and the institutional incentive given by the organization’s support of the program.

4. **Strategic dimension.** A major strategic barrier is that there is often no linkage between the quality improvement plans and strategic plans of a unit. The presentation of the recommendations to the senior hospital management and the presence of two members of the administrative staff in the focus group helped to link this project to the strategic goals of this hospital. Moreover, we presented this project several times to the board and the director of this hospital in order to diffuse knowledge of our activities among the hospital community.

**Discussion**

This study was conducted in a French medical and rehabilitation unit, with a specific case-mix and its own style of management. However, we note that our population of fallers had characteristics similar to those reported in the literature: more men [17], longer length of hospital stay [18], predominance of neurological pathologies [7,19], and a higher degree of dependency [20]. The conditions surrounding the occurrence of falls also confirmed findings in the literature, i.e. more falls at the end of the week [7,18], which can be explained by the psychological consequences of staying in hospital over the weekend. Falls occur more frequently after eating, especially among the elderly, perhaps due to post-prandial orthostatic hypotension [21]. We also observed that falls happened disproportionately after lunch, when caregivers were not readily available and when patients went to the toilet or for a nap. Finally, falls occurred most frequently in the bedroom, toilet, and bathroom [7].

**Limits of the study**

From a methodological perspective, one can argue that it would have been better to study the occurrence and the etiology of falls from the same sample, and that a case-control study would have been a better method for the comparison between fallers and non-fallers. Moreover, the results do not demonstrate the real impact of this prevention program on the occurrence of falls. These results have been limited to a quantitative analysis of falls, based on the data in the falls register, and showed:

1. A significant decrease in the rate of falls between 1995 and 1996 (44.6 to 36.3%; \( P < 0.1 \)), 1997 and 1998 (40.7 to 31%; \( P < 0.01 \)), and between 1995 and 1998 (44.6 to 31%; \( P = 0.0001 \)).
2. Analysis of the rates for fallers does not show any significant trend.
3. If we focus on the multi-fallers, the decrease in their rate between 1997 and 1998 (7.7 to 3.8%; \( P = 0.1 \)) and also between 1995 and 1998 (6.9 to 3.8%; \( P = 0.03 \)) is significant.

From the different phases of the quality improvement program, results suggest the following:

1. An initial decrease in the number of falls in 1996, linked to the announcement of the program.
2. An increase in the number of reported falls in 1997. Positive presentations, including clear communication on the medical aspects of the phenomenon, the need for systematic recording along with a precise definition, and limiting blame and legal implications for unit personnel seems to have led to improved awareness and recording.
A decline in the number of falls in 1998 linked to the implementation of recommendations.

Even if these results suggest a positive impact of such a program, they must be interpreted with great caution. Variables for case-mix should be controlled, the time period should be given more emphasis when interpreting the results regarding the historical trend in the occurrence of falls, and no evidence is given on changes in professional practice as a result of the prevention strategy. All these limitations have been noted and a statistical program, including follow-up of the different rates from 1999 to 2004 and development of a valid medical score to evaluate the risk of falls (recommendation No. 3), has been established.

Given these limitations, our main objective was to understand the role of CQI in improving a fall prevention strategy in a rehabilitation hospital. Taking this into consideration, this study showed that quality management methods provide three ways of improving organizational processes to prevent falls:

1. Identification of the organizational causes in addition to the clinical ones.
2. Development of methods for promoting implementation of the recommendations by all stakeholders.
3. Introduction of a vision of risk management.

Using accepted CQI principles and techniques, we identified all causes of falls. This approach helped us to identify high-risk situations due to clinical and organizational factors. By comparison, the literature (on falls) focuses mainly on clinical aetiologies, and rarely mentions organizational causes. Sehested [18] discussed some external causes, and Tinetti [10] examined extrinsic factors. Thus, this study is unique in its merging of clinical and organizational perspectives, and emphasizes the benefits of elucidating and formalizing the links between the organization of work and the risk of occurrence of falls.

It is well documented that the diffusion of any corrective actions requires not only clear definitions and recommendations, but also consideration of alternative strategies for implementation, as we mentioned above. We tested integrated quality management methods, and derived principles for managing the development and implementation of clinical and organizational recommendations among diverse stakeholders [15,16].

The development of pragmatic risk assessment tools is certainly a first step for preventing falls [12]. The objective of ‘zero-falls’ is unrealistic. CQI methods, and more broadly risk-management strategies, reinforce this view and stress the need for distinguishing avoidable and unavoidable occurrences of undesirable events and outcomes. This view suggests that since some falls are unavoidable, it is more reasonable to consider that actions for primary and secondary prevention must be complemented by actions of tertiary prevention to minimize consequences when the undesirable event occurs. This explains why some of the recommendations focus on clinical and organizational procedures after the occurrence of the fall.

## Conclusion

This study permits extension of existing CQI methods for designing and implementing a prevention program that may be incorporated directly into daily activity. In addition to education and therapeutic principles applied by medical and other staff, organizational recommendations concerning the use of equipment, staff vigilance for patient safety, and the availability of information to the patient and family appear to be equally as important. The challenge is to raise awareness among hospital personnel of the problems of internal organization and its impact on clinical events. It is also a way of directing inquiry into new areas (e.g., the managerial aspects of implementing clinical and organizational improvements). Finally, the study introduces a vision of risk management, where the possibility of unavoidable falls exists and the risk of falls is only partially preventable. The programs and recommendations do not aim to achieve an illusory objective of ‘zero falls’, but instead are designed to eliminate avoidable falls and to minimize the consequences of non-avoidable falls.

More than a sum of techniques, CQI offers a new frame of analysis when prevention strategies can combine clinical and managerial components. Further studies are needed to determine how these methods are able to direct inquiry into new areas for designing prevention strategies.

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